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U S NAVY RESPONSES TO U S EPA REGION V COMMENTS TO ECOLOGICAL RISK
ASSESSMENTS FOR SOLID WASTE MANAGEMENT UNIT 1, 2, 3, 4, 5, 9 AND 10 NSA
CRANE IN
8/13/2004
U S NAVY

(21)

**GENERAL RESPONSES FOR
USEPA COMMENTS DATED MARCH 19, 2004 ON
NSWC CRANE ECOLOGICAL RISK ASSESSMENTS FOR
SWMUS 1, 2, 3, 4, 5, 9, AND 10**

BACKGROUND

The Navy has prepared ecological risk assessments (ERAs) for NSWC Crane SWMUs 1, 2, 3, 4, 5, 9, and 10. U.S. EPA Region 5 has been reviewing the risk assessments and provided initial comments on several of the ERAs. After reviewing the responses, US EPA has provided further comments on NSWC Crane ERAs. These comments were transmitted to the Navy via e-mail on March 19, 2004 by Peter Ramanauskas. The following statements were contained in the e-mail.

"Attached please find an electronic copy of our comments on Crane's ecological risk assessments. These comments were generated by looking at SWMU 3 as the example case, but apply to the eco risk assessments done at the other SWMUs (1, 2, 4, 5, 9, 10) and those assessments should be revisited to make any corrections needed. Some comments specific to certain SWMUs are provided at the end of the document.

I will presume that we will be getting on a conference call at some point after you have had a chance to review these comments. At that time, I would like to revisit the topic of PBT upper trophic level dose modeling at the SWMUs and the Navy's rationale for not modeling."

US EPA's comments of March 19, 2004 consisted of 5 general comments, 29 comments which were specific to SWMU 3 (Jeep Trail / Little Sulphur Creek), and 2 comments that were applicable to SWMU 2 (Dye Burial Grounds). As noted above, the comments on SWMU 3 were intended to serve as a guide for revisiting other ecological risk assessments. EPA's comments and Navy responses to the comments have been reviewed with EPA in several telephone conferences and a meeting at NSWC Crane on June 9, 2004. In addition various documents have been exchanged between EPA and the Navy regarding various issues.

This document contains three categories of comments and responses to the general EPA comments, to issues that were identified in EPA's March 19, 2004 comments, and to issues that were identified in various phone discussions and a meeting with EPA Region 5. The first category of comments and responses, titled "General Comments from EPA's 3/19/04 E-Mail" consist of the general comments that USEPA submitted to the Navy on the ecological risk assessment (ERA) for SWMU 3. The Navy subdivided the comments into "a", "b", etc. for separation of issues for ease of response where multiple issues were identified in one general comment. The category of comments, titled, "General Issues from EPA's 3/19/04 E-Mail and Meetings" consists of general issues identified in specific comments in the 3/19/04 for SWMUs 2 and 3 that are general in nature and can also be applied to other SWMUs and the corresponding Navy response. The third category includes other issues that were identified, discussed and agreed upon in the following meeting/conference calls:

- April 1, 2004 conference call with the Navy, USEPA, and TtNUS
- June 9, 2004 technical meeting with the Navy, TtNUS, USEPA, and IDEM.
- July 8, 2004 conference call with TtNUS and USEPA
- July 15, 2004 conference call with TtNUS and USEPA
- July 23, 2004 conference call with TtNUS and USEPA

General issues 1 through 16 are based on EPA's 3/19/04 specific comments (1 through 29) on the Jeep Trail / Little Sulphur Ecological Risk Assessment. General Issues 17 through 21 are the other issues that were identified during the meetings and conference call discussed above. General issues 22 and 23 are based on EPA's 3/19/04 specific comments 1 and 2 on the Dye Burial Grounds Ecological Risk Assessment. Figures D-2 (soils), D-3 (sediment), and D-4 (surface water) illustrate the general ecological risk assessment process that will be followed, except as noted in the responses for existing ERAs.

Each ecological risk assessment (SWMUs 1, 2, 3, 4, 5, 9, and 10) will be reviewed using this document as the basis for the review. The results of the review for each SWMU will be documented in separate comment responses documents. In the case of SWMUs 2 and 3 responses will also be provided for the specific comments for each SWMU that were provided in the 3/19/04 EPA e-mail.

General Comments from EPA's 3/19/04 E-Mail

1a. Comment: The use of alternate benchmarks for ecological risk needs to be based on a chronic no observed adverse effect level (NOAEL) threshold (see Section 1.3.1 of the 1997 ERA Guidance, EPA 540-R-97-006) for the most sensitive receptor likely to be exposed to contaminants at the site.

Response: The Navy agrees that screening levels for ecological risk assessment (ERA) needs to be based on NOAELs for the most sensitive receptor likely to be exposed to contaminants at the site for the purposes of chemicals of potential concern (COPC) selection. For that reason, only Region 5 Ecological Data Quality Levels (EDQLs) were used as the screening levels to select COPCs (i.e., see Section 4.3 of the SWMU 3 RFI report). The alternate benchmarks were only used in Step 3a to further evaluate the chemicals that were retained as COPCs for specific endpoints, not the most sensitive endpoint. For example, an alternate benchmark based on risks to plants was used to evaluate risks to plants in Step 3a. However, regardless of the risks to plants, that chemical was evaluated to determine risks to invertebrates (if toxicity data were available) and/or mammals/birds (if the chemical was bioaccumulative). No changes were made to the existing ERAs to address this comment.

1b. Comment: A clarification statement must be made if the alternate benchmarks do not represent a chronic NOAEL for the most sensitive receptor or are being applied to flag serious (i.e., acute) ecological problems needing immediate action (e.g., interim measures) and the intended use is clear with respect to risk management.

Response: In many cases alternate benchmarks used to further evaluate potential risks from COPCs do not represent chronic NOAELs. As agreed to in the July 23, 2004 conference call, alternate benchmarks based on lowest observable adverse effects levels (LOAELs) can be evaluated in Step 3a as long as the effects of the benchmark are clearly discussed. The Navy agrees to explain the basis of the alternate benchmarks and their intended use with respect to risk management in the ERA.

1c. Comment: Any alternate screening benchmark needs to provide supporting information that it will be protective of the most sensitive receptor and explain how it will refine conservative assumptions (as stated in the Navy Policy for Conducting Ecological Risk Assessments).

Response: The Navy agrees that any alternate screening benchmark needs to provide supporting information that it will be protective of the most sensitive receptor. However, because

screening benchmarks are conservative and only used to select chemicals as COPCs, they do not need to refine conservative assumptions. None of the alternate benchmarks were used as screening levels to select chemicals COPCs. They were only used in Step 3a to further evaluate potential risks to specific receptor groups (i.e., plants, invertebrates) from the chemicals that were retained as COPCs. No changes will be made to the existing ERAs to address this comment.

1d. Comment: After reviewing the Navy Policy for Conducting Ecological Risk Assessments and revisiting the work plan for SWMU #3, no discussion is provided on developing an alternate screening benchmark that would deviate from a chronic no adverse effect level (NOAEL).

Response: The Navy agrees that no discussion was included in the approved QAPP for SWMU 3 (and approved QAPPs for the other SWMUs) on developing alternate screening benchmarks because only the Region 5 EDQLs were used as the screening levels to select chemicals as COPCs (see Section 4.3 of the SWMU 3 RFI report). Therefore, no discussions were necessary in regard to the use of alternate benchmarks for screening so no changes will be made to the existing ERA to address this comment. Alternate benchmarks used in Step 3a were discussed in QAPPs and ERAs for the existing SWMUs (i.e., see Section D.4.1 of the approved QAPP for SWMU 3 and Appendix H.3 of the SWMU 3 RFI report).

1e. Comment: For some chemicals, alternate benchmarks are appropriate when metal toxicity in surface water is controlled by water hardness and site water hardness is greater than 50 ppm. Likewise, sediment benchmarks that are developed using an equilibrium partitioning (EqP) equation (see footnote "s" in the Region 5, RCRA Ecological Screening Levels table) may be adjusted if site sediment data shows total organic carbon (TOC) is greater than one percent. Also a specific State water quality Criteria or Tier II value may be applied, as appropriate, for the site.

Response: The Navy agrees that hardness and TOC can be used to adjust alternate benchmarks, as appropriate, and also that Tier II values may be appropriate for sites. Hardness and TOC have been used in the Step 3a evaluation in some of the ERAs, as needed, and they will be used in future ERAs to adjust the screening levels if the water hardness is greater than 50 ppm and/or the TOC in the sediment is greater than 1%. In cases where alternate screening values are calculated (metal toxicity based on water hardness, adjusting sediment benchmarks to account for site specific-TOC, etc.) details on the basis for the adjustment will be provided. Tier II values also been and will be used in some of the ERAs at Crane.

2. Comment: Screening ecological risk benchmarks will be based on toxicity. *Therefore, background soil data will not be used as an alternate benchmark.* Specifically, the OSWER policy (Role of Background in the CERCLA Cleanup Program, April 26, 2002, OSWER 9285.6-07P) recommends that constituents that exceed risk-based screening concentrations be retained and addressed in the risk characterization. This OSWER policy is available at: <http://www.epa.gov/superfund/programs/risk/tooltrad.htm> and the above recommendation is found in the section on Consideration of Background in Risk Assessment.

Response: The Navy agrees that background soil data should not be used as an alternate benchmark. The soil background data was used to select chemicals as COPCs as was presented in the approved QAPPs. However, as discussed in the June 9, 2004 technical meeting at Crane, the Navy agreed that background will not be used to select chemicals as COPCs in future ERAs at Crane. In future ERAs, chemicals that were detected at concentrations greater than the screening levels but below background will be qualitatively discussed as the first part of the Step 3a evaluation. During the July 23, 2004 conference call, it was agreed that for the reports that have already been completed, which used background to select COPCs, the Navy

would just need to add a statement to the executive summary (ES) and the ERA to indicate that background was used to select the COPCs, however based on current USEPA and Navy guidance, background will not be used to select COPCs in future ERAs.

Background soil data was discussed in Step 3a to indicate that a chemical was retained as a COPC because it was detected at concentrations that exceeded the screening level and background concentrations. The background soil data was also discussed for a few chemicals to indicate that the screening levels were well below background concentrations or to show that the chemical concentrations in the site samples were only slightly greater than background. This was not done to indicate that there were no risks, only that there may be no site-related risks. The background data that will be evaluated in the Step 3a discussions will include the base wide soil background data set, upgradient surface water and sediment samples, and Indiana background sediment data¹.

3a. Comment: Supporting information is needed to justify how "Magnitude of criterion exceedance" and "Frequency of chemical detection" can be used to determine there is no need for further site evaluation and/or chemical toxicity is of no concern.

Response: The "magnitude of exceedance" and the "frequency of detection" were used to select chemicals as COPCs because even if a chemical was detected in one sample at a concentration that slightly exceeded a screening level it was still retained as a COPC. The "magnitude of exceedance" and the "frequency of detection" were used qualitatively to determine if it is likely that the chemical is causing a risk to ecological receptors. For example, if a chemical concentrations in one sample is just slightly greater than a no effects level it is unlikely that the chemical is causing significant risks. Also, if a chemical is detected at relatively low concentrations in 1 of 15 samples (and not detected in the other samples), it is also unlikely that the chemical is causing a significant risk. Therefore, these two factors are applied using professional judgment, in consideration of the following factors (as examples):

- Number of samples that had chemical concentrations that were greater than and EDQL (or other benchmark/toxicity data)
- Area represented by samples that had chemical concentrations that were greater than and EDQL (or other benchmark/toxicity data)
- Is the EDQL (or other benchmark/toxicity data) an no-effects level or a low-effects level
- Chemical concentrations compared to detection limit
- Heterogeneity of chemicals across the site

3b. Comment: If this is a procedure to address hot spots, the risk assessment will still need to delineate the area where the chemical concentration exceeds the chronic NOAEL for the most sensitive receptor.

Response: The procedure can be used to address hot spots, but it can also be used to show that the potential for risks are low, as discussed above. The Navy provides chemical tag maps that present the chemical concentrations at each sample location that exceed a screening level. Therefore, no changes were made to the existing ERA to address this comment.

¹ Wente, Stephan P., 1994. Sediment Background Concentration Distribution of 172 Potential Pollutants in Indiana. Department of Forestry

4. Comment: State what method(s) will be employed to determine metal bioavailability along with site specific field measurements that are being used (or reference a section of the report where this is discussed).

Response: Various methods were and will be used to evaluate metal bioavailability as part of ERAs for Crane as follows:

- o In accordance with the new USEPA Eco SSLs, the Eco SSLs for aluminum and iron are based on pH of the soil so if the soil pH is below a certain level, these metals are assumed to not be bioavailable and they will not be retained as COPCs.
- o The new USEPA Eco SSL guidance document has a matrix to qualitatively determine the bioavailability of metals based on the soil pH and TOC. This matrix will be used to evaluate qualitatively evaluate bioavailability of the metals
- o The hardness of surface water is used to adjust the water quality criteria for select metals using USEPA equations.
- o At sites where sediment samples are analyzed for acid volatile sulfides/simultaneously extracted metals (AVS/SEM), the AVS/SEM can be used to evaluate the bioavailability of some metals in sediment. If the concentration of AVS is greater than the concentration of SEM than the metals that are included in the SEM analysis are not considered to be bioavailable.
- o The form of the chemical that was used to conduct the toxicity tests that serve as the basis for the criteria may be discussed. For example, many of the toxicity tests used to develop screening levels for metals use highly bioavailable forms of the metal, such as metals salts, which in many cases are much more toxic than equivalent concentrations of the metals in field collected soils².

The methods described above will be used in a quantitative and/or qualitative manner using professional judgment to determine if it is likely that the chemical concentrations in the media being evaluated have a high likelihood of causing risks.

5a. Comment: Only the maximum concentration (see Section 1.2.2 and Step 2 of the 1997 ERA Guidance, EPA 540-R-97-006) will be compared against the Region 5, RCRA ESLs to screen COPCs.

Response: Only the maximum concentrations were compared against the Region 5, RCRA EDQLs to select chemicals as COPCs in the existing ERAs [note the ESLs will be used for screening in future ERAs] (i.e., see Section 4.3 of the SWMU 3 RFI report). Therefore, no changes will be made to the existing ERAs to address this comment.

5b. Comment: If used, alternate screening benchmarks need to be based on a chronic NOAEL for the most sensitive receptor likely to be present.

Response: As presented in response to comment No. 1, none of the alternate benchmarks were used in the screening step of the ERA to select COPCs. They were only used in Step 3a to further evaluate the chemicals that were retained as COPCs. Therefore, no changes will be made to the existing ERA to address this comment.

² Allen, Herbert E. 2002. Bioavailability of Metals in Terrestrial Ecosystems: Importance of Partitioning for Bioavailability to Invertebrates, Microbes, and Plants. Society of Environmental Toxicology and Chemistry.

5c. Comment: Supporting information is needed to justify how an average concentration will apply to the most sensitive receptor likely. Average concentrations can be applied following Step 3a when a conceptual model, assessment endpoints, exposure areas and sampling frequency are clearly defined.

Response: Average concentrations were used in Step 3a for a few chemicals. As discussed in the July 23, 2004 conference call, average concentrations can be used as long as it made clear how the average concentrations relates to the exposure area for the receptors that are being protected. When average concentrations are used, the conceptual model, assessment endpoints, exposure areas and sampling frequency will be clearly defined.

General Issues from EPA's 3/19/04 E-Mail and Meetings

1. Comment: For chemicals that are known to be persistent bio-accumulative toxic chemicals, an earthworm is not an adequately sensitive receptor.

Response: The Navy agrees that for chemicals that are known to be persistent bio-accumulative toxic chemicals, an earthworm is likely not the most sensitive receptor, but the section of the report referenced by this comment was the Step 3a evaluation of risks to plants and invertebrates. The Step 3a evaluation of risks to wildlife was presented in a later section of the ERA and bioaccumulative chemicals are included in that evaluation.

2. Comment: The Dutch "Indicative Levels" shows that plant and animal life is seriously impaired (i.e., 50% of the species experience negative effects) and does not represent a screening benchmark (i.e., chronic NOAEL) as described in general comment number one.

Response: As agreed to in the June 9, 2004 technical meeting, the Dutch numbers will not be used in the ERAs and all discussions related to the Dutch numbers will be removed from the existing ERAs. The only exceptions would be in a few instances when the ecological basis of the numbers can be justified; the justification will be included in the ERA.

3. Comment: The Canadian Soil Quality Guidelines does not clearly state that a Residential/Parkland value is a chronic NOAEL intended to protect sensitive receptors (see general comment # 1).

Response: The toxicological basis for the Canadian SQGs will be presented in the ERAs when they are used.

4. Concerns with the Canadian protocol include the following:

a. not intended to protect all wild plants and animals as noted in the land use definition "parkland is defined as a buffer zone between areas of residency and campground areas and excludes wild lands such as national or provincial parks"

Response: No ecological screening levels are protective of all plants or animals because they are developed using toxicity data from a select group of standard species. However, as described in the specific Canadian Soil Quality Guideline (SQG) reports, many of the SQGs are developed using standard species for conducting plant toxicity tests (i.e., lettuce, radish, etc). These are the same types of tests that were used to develop the USEPA Eco SSLs. Therefore, the Navy believes that the species used to develop the SQGs are acceptable for evaluating data in Step 3a of the ERA.

b. the guideline uses a lowest observed effect concentration (LOEC) rather than a NOAEL. note, the "no potential effects range" (NPER) benchmark uses a LOEC

Response: The Canadian SQGs use various uncertainty factors to approximate no effects levels, or low levels of potential effects. As discussed above, the toxicological basis for the Canadian SQGs will be presented in the ERAs when they are used. However, as stated in response to Comment No. 1, the alternate benchmarks were not used for screening so they do not necessarily need to be based on no-effects concentrations.

c. **food web exposure to insectivores (e.g., shrew or robin) does not appear to be incorporated into the guideline. The Canadian soil value for naphthalene needs more documentation.**

Response: Food web exposure to insectivores (e.g., shrew or robin) is not incorporated into the Canadian SQG, but the SQGs were not used by the Navy to evaluate risks to food chain receptors in the ERAs. The SQGs were only used to evaluate risks to plants and invertebrates.

5. **Comment: The recently released U.S. EPA report, Ecological Soil Screening Level (Eco-SSL) for the following chemicals will replace the Region 5, RCRA ESL and needs to be used as the soil screening benchmark: aluminum, antimony, barium, beryllium, cadmium, cobalt, iron, lead, and dieldrin.**

Response: The Navy agrees to use the USEPA Eco SSLs selecting chemicals as COPCs in soil in future ERAs. The Eco SSLs will be discussed in Step 3a for the existing ERAs as agreed to in the July 23, 2004 conference call.

6 **Comment: The ORNL benchmarks are not chronic NOAELs and do not represent the most sensitive receptor (see general comment # 1).**

Response: As presented in the response to comment No. 1, the ORNL benchmarks were not used as screening values to select chemicals as COPCs. The ORNL benchmarks were only used in Step 3a to further evaluate risks to plants and invertebrates. Therefore, they do not need to be chronic NOAELs or represent the most sensitive receptors. Also, as presented in the response to comment No. 1, the basis of the alternate benchmarks will be presented in the ERA so that its intended use with respect to risk management is described.

7 **Comment: Eco-SSLs for several chemicals are in development and will replace the Region 5, RCRA ESL. When available the Eco-SSLs need to be used as the soil screening benchmark.**

Response: The Navy will use the Eco-SSLs for selecting chemicals as COPCs for future ERAs when they are available when the ERA is prepared.

8 **Comment: The chemical values in the report "Preliminary Remediation Goals (PRG) for Ecological Endpoints" (ORNL ES/ER/TM-162/R2 August 1997) are not intended to be used for screening, but are thresholds for significant adverse effects.**

Response: The Navy agrees that PRGs are not intended for screening, but as stated in the referenced PRG document, "PRGs are intended to correspond to minimal and acceptable levels of effects on the general ecological assessment endpoints as defined in the data quality objectives (DQO) process for ecological risk assessments on the Oak Ridge Reservation (Suter et al. 1994). In general, they correspond to small effects on individual organisms which would be expected to cause minimal effects on populations and communities." Therefore, concentrations below the PRGs are not expected to cause significant adverse effects.

9 Comment: The “effects range – low” (ERL) value is not an alternate benchmark for a chronic NOAEL, but it is a higher toxicity gradient than the threshold effects level (TEL) used in the EPA Region 5 ESL table. The ERL is the lower 10th percentile concentration of sediment toxicity data and a value where toxicity can be expected. The TEL (not the ERL as stated in the report) is the concentration below which adverse effects are expected rarely.

Response: The Navy agrees that the ER-L is not a chronic NOAEL, but neither is the TEL that is used in the EPA Region 5 ESL table. As cited in the Consensus-Based Sediment Quality Guidelines article by MacDonald et al., (2000), the ER-L “represents the chemical concentration below which adverse effects would rarely be expected.” This definition is similar to that as the TEL which “represent the concentration below which adverse effects are expected to occur only rarely” (MacDonald et al., 2000). Also, note that the TEC value (i.e., not toxic), which is used as the revised Region 5 RCRA ESL, incorporates the Ontario lowest effect level (LEL), TEL and ER-L values.

As indicated by USEPA in the July 23, 2004 conference call, although the TEC is more of a LOAEL than a NOAEL, it is acceptable for screening because USEPA is trying to protect benthic invertebrate communities, not populations. Therefore, the values can be greater than no-effects levels. No changes were made to the existing ERA to address this comment.

10 Comment: Likewise, the “effects range – median” will represent the 50th percentile of sediment toxicity data and upper effects threshold values will be a concentration where adverse impacts would always be expected.

Response: As presented in the consensus article (MacDonald et al., 2000); the ER-M “represents the chemical concentration above which adverse effects would frequently occur.” Therefore, the Navy does not agree that the ER-M is the chemical concentration above which adverse impacts would always occur. As discussed and agreed to by USEPA in the June 9, 2004 technical meeting, the Navy will present one lower effects level and one higher effects level (such as the PEC) to show the range of the effects levels because the lower effects levels and higher effects levels provide probabilities of effect. The Navy will clearly present the basis of those values in the ERAs (where used) and how they were used in the ERA.

11 Comment: The screen is a pass-fail process.

Response: The Navy agrees that the screen is a pass-fail process. However, the section of the SWMU 3 RFI report that the comment references (Section 8.6.1.2) is not the screening step. The COPC screens were conducted in earlier sections of the RFI reports (i.e., Section 4.3 for SWMU 3).

12 Comment: Sediment toxicity needs to be limited to freshwater species with reported chronic NOAELs. The LOEC and NOEC values for TNT, based on marine and estuarine organisms, are not acceptable as alternate benchmarks.

Response: Although freshwater toxicity data/benchmarks are preferred for evaluating risks to organisms in freshwater, marine benchmarks are often used as surrogates for chemicals that do not have freshwater toxicity data/benchmarks. As indicated by USEPA in the July 23, 2004 conference call, although the TEC is more of a LOAEL than a NOAEL, it is acceptable for screening because USEPA is trying to protect benthic invertebrate communities, not populations. Therefore, the values can be greater than no-effects levels. As discussed and agreed to by USEPA in the June 9, 2004 technical meeting, the Navy will present one lower effects level and one higher effects level (such as the PEC) to show the range of the effects levels because the

lower effects levels and higher effects levels provide probabilities of effect. The Navy will clearly present the basis of those values in the ERAs (where used) and how they were used in the ERA.

13 Comment: The “probable effects concentration” (PEL) represents a level where adverse effects are frequently expected and is not an alternate benchmark for a chronic NOAEL. The lack of information on the toxicity (i.e., chronic NOAEL) for a chemical needs to result in a decision to continue with the ecological risk assessment process, Steps 3 through 7 (see Section 2.5 of the 1997 ERA Guidance, EPA 540-R-97-006).

Response: As discussed in the June 9, 2004 technical meeting, for chemicals where the only toxicity data available is an AET or some other higher effects level, it was agreed to carry the chemical through the ERA but it would not be quantitatively evaluated. It was noted during the meeting that this approach was acceptable because usually if there is a problem at the site, it would be caused by other chemicals that have toxicity data. The Navy does not agree that chemicals with only higher effects levels need to be evaluated in Steps 3 through 7 of the ERA process. Steps 3 through 7 are the baseline ERA (BERA) and typically include the collection of site-specific biological data (i.e., toxicity tests, biological surveys, etc.). Therefore, a site should not proceed to a BERA just because a chemical only has a higher effects level.

14 Comment: The “effects range-low” (ER-L) for antimony represent the lower range of sediment toxicity (see specific comment #16) and the “effects range-median” (ER-M) is the median value of sediment toxicity. Neither the ER-L nor the ER-M is alternate benchmarks for a chronic NOAEL.

Response: Navy agrees that neither the ER-L nor ER-M are chronic NOAELs, but neither is the TEL that is used in the EPA Region 5 ESL table. As indicated by USEPA in the July 23, 2004 conference call, LOAELs are acceptable for screening benchmarks for sediment invertebrates because USEPA is trying to protect benthic invertebrate communities, not populations. Therefore, the values can be greater than no-effects levels. No changes will be made to the existing ERA to address this comment.

15 Comment: The “apparent effect thresholds” (AETs) were not developed to evaluate ecological risk and they represent a level where adverse biological impacts are always expected and adverse impacts are also known to occur at levels below the AET.

Response: The Navy agrees that the AET represents a level where adverse biological impacts are always expected and adverse impacts are also known to occur at levels below the AET. No changes will be made to the existing ERA to address this comment.

16 Comment: The lack of information on the toxicity (i.e., chronic NOAEL) of chemicals result in a decision to continue with the ecological risk assessment process, Steps 3 through 7 (see Section 2.5 of the 1997 ERA Guidance, EPA 540-R-97-006).

Response: The Navy agrees to carry a chemical through the ERA if there is no toxicity data for that chemical, unless other factors in Step 3a (i.e., frequency of detection) as used to eliminate it from further evaluation. However, the Navy does not agree that chemicals with only higher effects levels need to be evaluated in Steps 3 through 7 of the ERA process. Steps 3 through 7 are the BERA and typically include the collection of site-specific biological data (i.e., toxicity tests, biological surveys, etc.). Therefore, a site should not proceed to a BERA just because a chemical is lacking toxicity data.

17 Comment: It was not clear that the Step 3a evaluation was designed to eliminate chemicals as COPCs for certain groups of receptors and that chemicals that are screened out for one receptor group would still be evaluated for other receptor groups.

Response: The Navy agreed to add text to the beginning of the Step 3a evaluation to indicate the evaluation will consist of screening out chemicals for the various receptor groups, starting with plants/invertebrates, aquatic receptors, and ending with wildlife. The text will reference the flow charts (see attached) that were prepared to present the ERA process for evaluating chemicals in soil, sediment, and surface water.

18 Comment: The ERA should indicate the State designated water uses for the water bodies at Crane and if there are any threatened, endangered, or special concern species in the water bodies just off-site of Crane (i.e., outside the base boundaries)?

Response: The ERAs will present the recognized water uses as regulated by the State of Indiana and will determine if there may be threatened, endangered, or special concern species in the water bodies just off-site of Crane (i.e., outside the base boundaries).

19 Comment: If there is not a screening level for one of the receptors it may be possible to determine that the receptor is less sensitive to the chemical compared to a receptor for which a screening level was developed.

Response: If there is not a screening value for one of the receptors an attempt will be made to indicate that other receptors are less (or more) sensitive than the receptors for which a screening level was developed. Therefore, a qualitative evaluation can be conducted to evaluate risks to the receptor that does not have a screening level or other toxicity data established for a particular chemical. This information may not be available for many chemicals but where it is, it can be used. It would typically be for classes of chemicals such as PCBs, PAHs, etc.

20 Comment: Need to develop list of chemicals that will be carried through the food chain model for herbivorous and invertivorous mammals and birds and carnivorous birds and mammals.

Response: As discussed at the June 9, technical meeting, USEPA indicated that the fox and hawk models do not need to be conducted at most sites unless there is a really a problem with bioaccumulative chemicals. Also, during the July 23, 2004 conference call, it was agreed that the chemicals that were carried through the food chain model in the ERAs conducted to date, which used the list of important bioaccumulative chemicals from USEPA (2000), EPA/823/R-00/001 was acceptable for those ERAs and the food chain models would not need redone. Phthalates were not been included in the food chain modeling they were not included on the list of important bioaccumulative chemicals in USEPA (2000). It was agreed that for future ERAs, TiNUS would generate a list of chemicals that would be carried through the food chain model for small mammals and birds and a separate list that would be used for higher trophic level carnivores such as hawks and foxes. At that time, phthalates could be included in that list for future ERAs.

21 Comment: Chemicals with concentrations/doses greater than no-effects levels should be evaluated in Step 3a.

Response: Step 3a will include and evaluation of all chemicals with concentrations/doses greater than no-effects levels.

22 Comment: The ERA should present more qualitative information of the potential for exposure to threatened and endangered (T&E) reptiles at the site (as one reptile species was identified as a T&E species). For example, the ecological risk assessment should include information detailing the likelihood of the presence of reptilian receptors, the mechanisms through which these receptors may be impacted, and possible individual and/or population level impacts to these receptors. Otherwise, without qualification, the sentence, "...there are uncertainties in risks to reptiles because there is a lack of exposure

factors for reptiles and a lack of reptile toxicity data for the detected chemicals” is open to interpretation. Revise the document as requested.

Response: During the April 1, 2004 conference call, the Navy agreed to add qualitative information to both existing and future ERAs regarding the potential or likelihood that T&E reptiles (and other T&E species) are present based on the habitat such as the physical factors or site characteristics affecting exposure of reptiles (or other T&E species).

23 Comment: Surface soil exposures and sub-surface soil exposures should be examined (if applicable) for receptors at the site. In order to examine these exposures, soil sampling depth classes need to be developed. U.S. EPA has suggested the 0 to 0.5 foot below ground surface (ft bgs) as being reflective of surface soils exposure pathways, and 0.5 to 2 foot bgs as reflective of subsurface soil exposure pathways, based on best professional judgment and experience with other sites in the region and across the nation.

U.S. EPA clearly understands that earthworms, plants, and burrowing wildlife will not necessarily restrict foraging or burrowing activities to these specific depth classes; however, it should be realized that these receptors of concern are representative species that are used to estimate risk for all of the potential receptors residing at, or otherwise using, the site.

It should also be noted that this recommendation has been provided to assist in the design of future sampling events. That is, it is not necessary to revise the ecological risk assessment based on collection of a new data set.

However, future sampling activities should be designed to incorporate this approach, or sound rationale should be provided for the Navy's selection of 0 to 1 ft bgs and 0 to 2 ft bgs for examining various soil exposures for receptors at the Site.

The rationale should clearly state why the Navy feels it is not necessary to separate surface soil and sub-surface exposure pathways, and why it is appropriate to use two different soil sampling depth classes depending on the analytes being examined (e.g., 0 to 1 ft bgs for inorganic parameters and 0 to 2 ft bgs for dye parameters at SWMU 2.)

Response: Generally at NSWC Crane surface soil samples are collected from a depth of 0 to 2 feet (excepting volatiles which are collected from a depth of 0.5 feet to 2 feet). Samples for each fraction are collected from the entire interval. In some cases historical information or the need for data to support a CMS may warrant collection of fractions from different depths.

The Navy does not agree that samples from two separate intervals within the top two feet need to be collected to evaluate ecological risk. Most ecological receptors will be exposed to contaminants in the top two feet of soil as they move through the soil column.

For future ERAs, surface soil intervals will be chosen on a site-specific basis and the rationale for the choice of the surface interval would be provided in the planning documents and in the ERA.

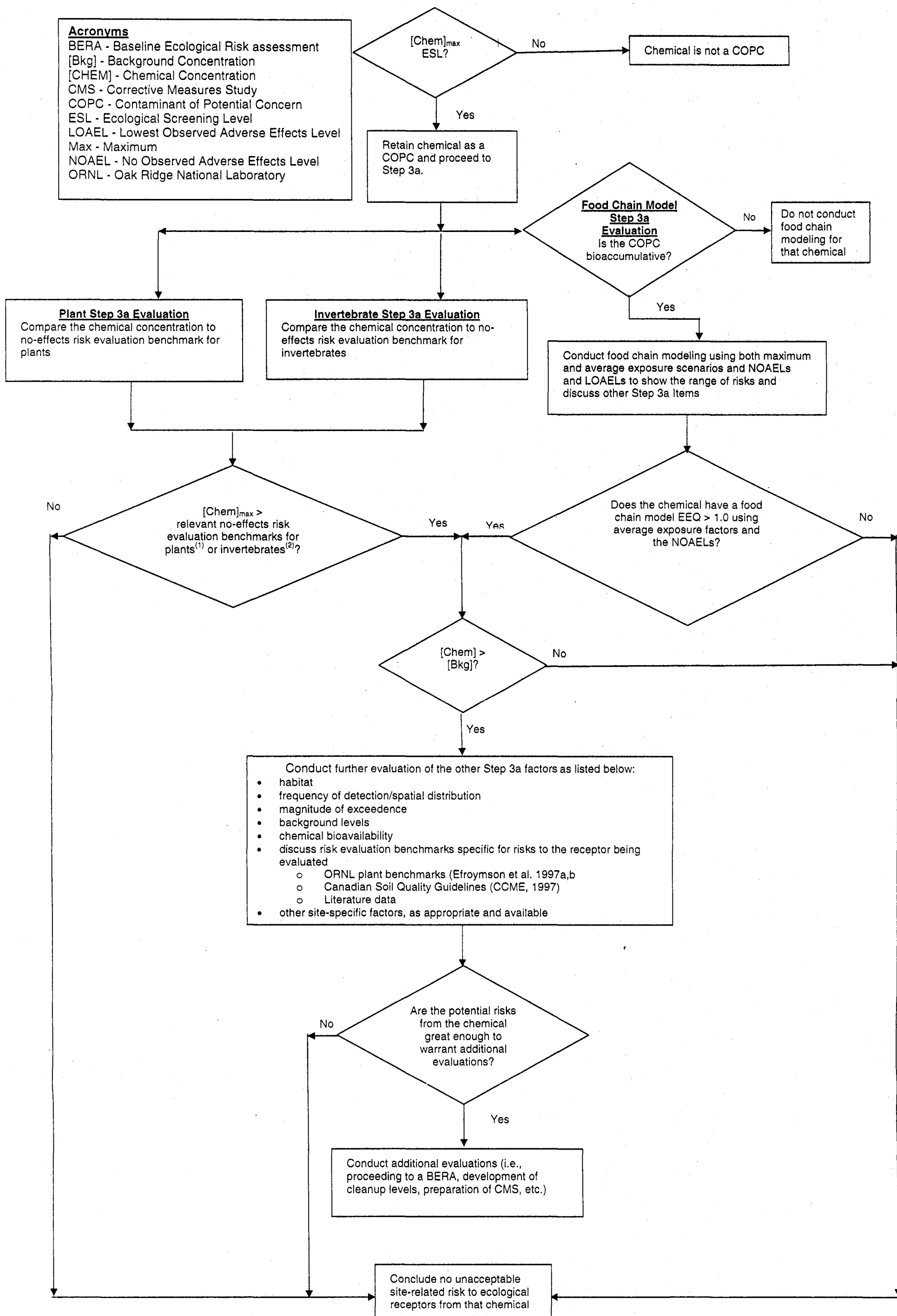


FIGURE D-2

GENERAL ERA PROCESS FOR EVALUATION OF RISKS TO CHEMICALS IN SURFACE SOIL AT NSWC CRANE, INDIANA
 SWMUs 8 AND 15
 NSWC CRANE, CRANE, INDIANA

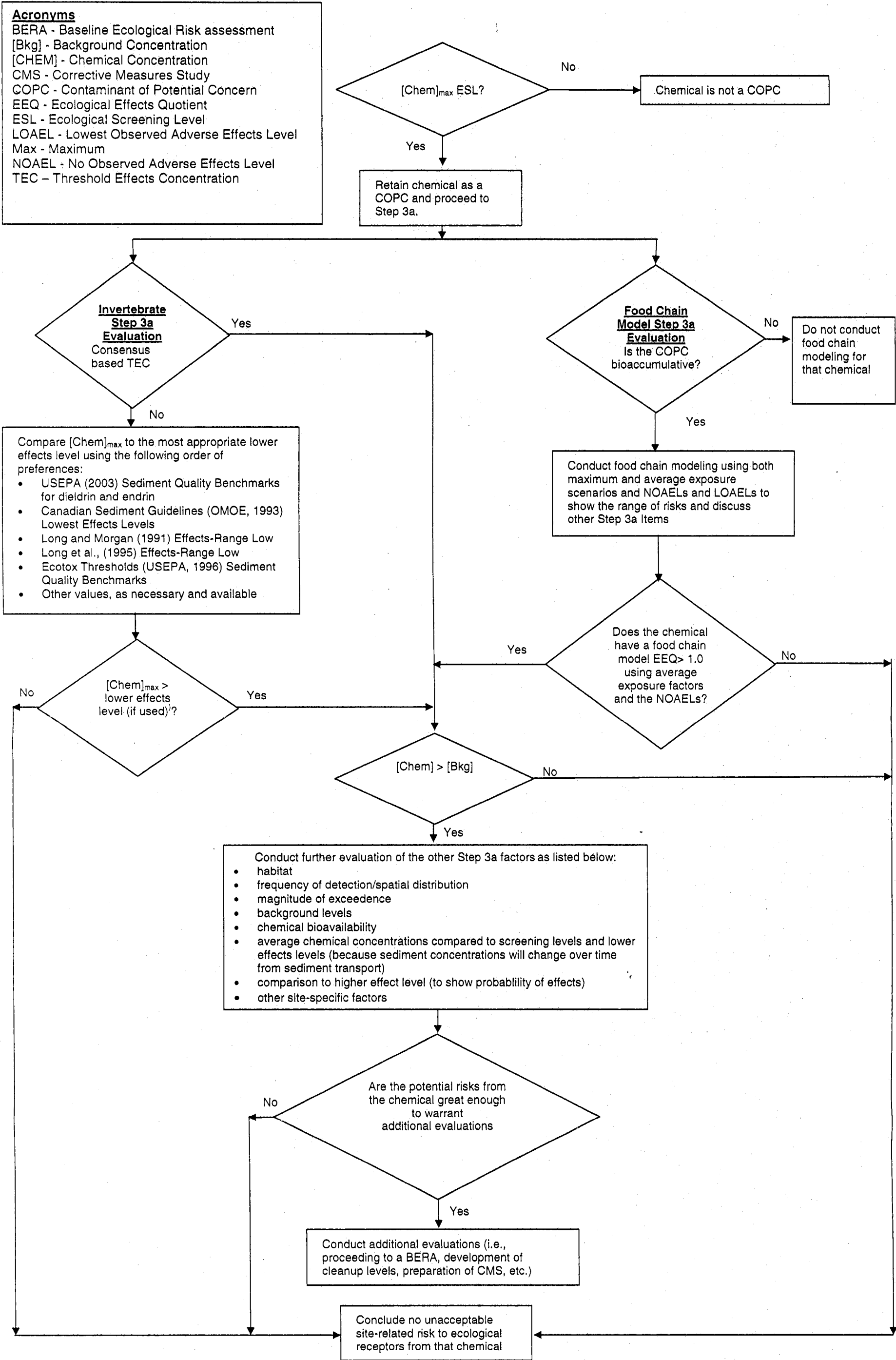


FIGURE D-3

GENERAL ERA PROCESS FOR EVALUATION OF RISKS TO CHEMICALS IN SEDIMENT AT NSW CRANE, INDIANA
SWMUs 8 AND 15
NSWC CRANE, CRANE, INDIANA

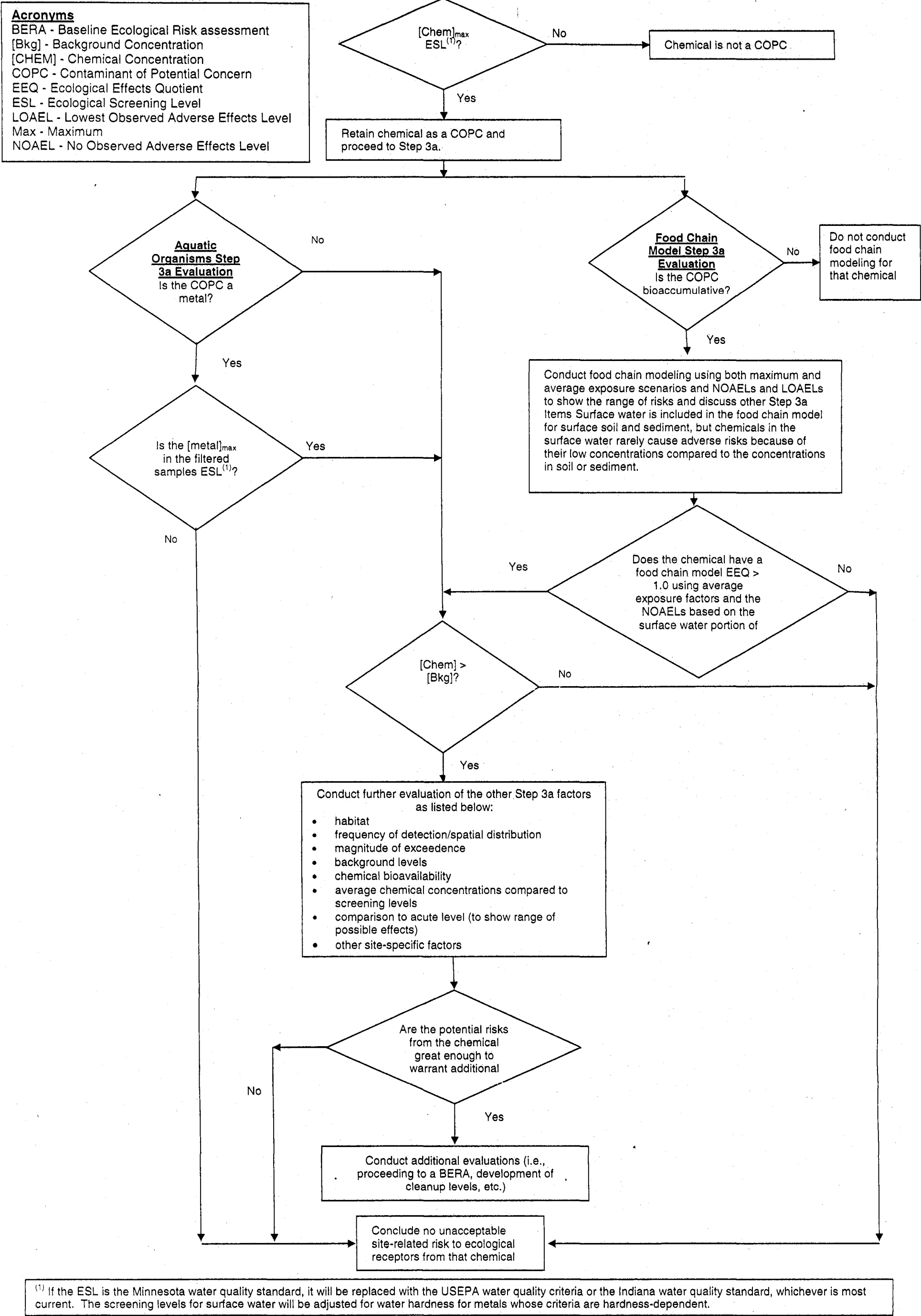


FIGURE D-4

GENERAL ERA PROCESS FOR EVALUATION OF RISKS TO CHEMICALS IN SURFACE WATER AT NSWC CRANE, INDIANA
SWMUs 8 AND 15
NSWC CRANE, CRANE, INDIANA